

Program Outcome and Course Outcome

F.Y.BSc.(CS)

1) F.Y.B.Sc. (Computer Science) Program Outcome

- To develop problem solving abilities using a computer.
- To build the necessary skill set and analytical abilities for developing computer based solutions for real life problems.
- To train students in professional skills related to Software Industry.
- To prepare necessary knowledge base for research and development in Computer Science.
- To help student build-up a successful career in Computer Science and to produce entrepreneurs who can innovate and develop software products.
- To develop the ability to analyze a problem and devise an algorithm to solve it.
- To formulate algorithms, pseudocodes and flowcharts for arithmetic and logical problems
- To understand structured programming approach.
- To develop the basic concepts and terminology of programming in general.
- To implement algorithms in the 'C' language.

➤ Semester- I Paper - I Course Type: Core Credit

Course Code: CS101

Course Title : Problem Solving Using Computer and 'C' Programming – I

Course Outcomes - On completion of this course, students will be able to :

1. Explore algorithmic approaches to problem solving.
2. Develop modular programs using control structures and arrays in 'C'

Course Code: CS102

Course Title : Database Management Systems

Course Outcomes - On completion of the course, student will be able to–

1. Solve real world problems using appropriate set, function, and relational models.
2. Design E-R Model for given requirements and convert the same into database tables.
3. Use SQL.

Course Code:CS103

Title : Practical course on Problem Solving using Computer and 'C' programming and Database Management Systems

Course Outcomes:- On completion of this course, students will be able to :

1. Devise pseudocodes and flowchart for computational problems.
2. Write, debug and execute simple programs in 'C'.
3. Create database tables in postgresQL.
4. Write and execute simple, nested queries.

➤ **Semester- II Paper - II Course Type: Core Credit**

Course Code: CS201

Course Title : Advanced 'C' Programming

Course Outcomes:- Student will be able to :-

- Develop modular programs using control structures, pointers, arrays, strings and structures
- Design and develop solutions to real world problems using C.

Course Code: CS202

Course Title : Relational Database Management Systems

Course Outcomes - On completion of the course, student will be able to—

- Design E-R Model for given requirements and convert the same into database tables.
- Use database techniques such as SQL & PL/SQL.
- Explain transaction Management in relational database System.
- Use advanced database Programming concepts

Course Code:CS203

Title : Practical Course on Advanced 'C' Programming and Relational Database Management Systems

Course Outcomes:- On completion of this course, students will be able to :

- Write, debug and execute programs using advanced features in 'C'.
- To use SQL & PL/SQL.
- To perform advanced database operations.

2) F.Y.B.Sc. Computer Science (Electronics) Program Outcome

To provide knowledge of technological and practical aspects of electronics.

- To familiarize with current and recent technological developments.
- To enrich knowledge through activities such as industrial visits, seminars, projects etc.
- To train students in skills related to computer industry and market.
- To create foundation for research and development in Electronics/ Computer Science.

- To develop analytical abilities towards real world problems
- To help students to build-up a progressive and successful career.

➤ **SEMESTER I Paper I**

ELC-111: Semiconductor Devices and Basic Electronic Systems

Course Outcomes – On completion of this course, students will be able to :

1. knowledge of various types of semiconductor devices
2. make elementary electronic circuits and systems

➤ **SEMESTER I PAPER II**

ELC 112: Principles of Digital Electronics

Course Outcomes – On completion of this course, students will be able to :

1. To get familiar with concepts of digital electronics
2. To learn number systems and their representation
3. To understand basic logic gates, Boolean algebra and K-maps
4. To study arithmetic circuits, combinational circuits and sequential circuits

➤ **SEMESTER II PAPER I**

ELC 121: Instrumentation Systems

Course Outcomes – On completion of this course, students will be able to :

1. To study Instrumentation System
2. To study various blocks of Instrumentation System
3. To study Smart Instrumentation System.

➤ **SEMESTER II PAPER II**

ELC 122 : Basics of Computer Organisation

Course Outcomes – On completion of this course, students will be able to :

1. To get familiar digital sequential circuits
2. To study Basic computer Organization
3. To study Memory architecture

3) F.Y.B.Sc. (Computer Science) Statistics

Course Outcome :- At the end of the course students are expected to be able

- i) To understand the relationship between two variables using scatter plot.
- ii) To compute coefficient of correlation, coefficient of regression.
- iii) To fit various regression models and to find best fit.

- iv) To fit the Normal distribution.
- v) To understand the trend in time series and how to remove it.
- vi) To apply inferential methods for real data sets.
- vii) To generate model sample from given distributions.
- viii) To understand the importance and functions of different statistical organizations in the development of nation.

4) F.Y.B.Sc. Mathematics (Computer Science)

Course Outcome: Upon successful completion of this course, the student will be able to:

- i) A student should be able to work with graphs and identify certain parameters and properties of the given graphs.
- ii) A student should be able to perform certain algorithms, justify why these algorithms work, and give some estimates of the running times of these algorithms.
- iii) A student should be able to solve basic exercises of the type: given a graph with properties X, prove that the graph also has property Y.
- iv) A student should develop an appreciation for the literature on the subject and be able to read and present results from the literature.
- v) A student should be able to write cohesive and comprehensive solutions to exercises and be able to defend their arguments.

S.Y.B.Sc.(CS)

1) S.Y.B.Sc. (Computer Science)

Course Objectives

1. To learn the systematic way of solving problem
2. To understand the different methods of organizing large amount of data
3. To efficiently implement the different data structures
4. To efficiently implement solutions for specific problems
5. To apply linear data structures.

➤ Paper - I Course Code: CS 231

Title : Data Structures and Algorithms – I

Course Outcomes: On completion of the course, student will be able to

1. To use well-organized data structures in solving various problems.
2. To differentiate the usage of various structures in problem solution.
3. Implementing algorithms to solve problems using appropriate data structures

➤ **Paper -II Course Code: CS 232**

Title : Software Engineering

Course Outcomes On completion of the course, student will be able to

1. Compare and chose a process model for a software project development.
2. Identify requirements analyze and prepare models.
3. Prepare the SRS, Design document, Project plan of a given software system.

➤ **Course Code: CS 241**

Title : DATA STRUCTURES AND ALGORITHMS-II

Course Outcomes: On completion of this course students will be able to

- Implementation of different data structures efficiently
- Usage of well-organized data structures to handle large amount of data
- Usage of appropriate data structures for problem solving

➤ **Paper - I Semester II Course Code: CS 242**

Title : Computer Networks-I

Course Outcomes

1. Have a good understanding of the OSI and TCP/IP Reference Models and in particular have a good knowledge of Layers.
2. Understand the working of various protocols.
3. Analyze the requirements for a given organizational structure and select the most appropriate networking architecture and technologies

2) S. Y. B. Sc. (Computer Science), Mathematics

Course Outcomes :

- (i) A student should be able to recall basic facts about mathematics and should be able to display knowledge of conventions such as notations, terminology and recognize basic geometrical figures and graphical displays, state important facts resulting from their studies.
- (ii) A student should get a relational understanding of mathematical concepts and concerned structures, and should be able to follow the patterns involved, mathematical reasoning.
- (iii) A student should get adequate exposure to global and local concerns that explore them many aspects of Mathematical Sciences.
- (iv) A student be able to apply their skills and knowledge, that is, translate information presented verbally into mathematical form, select and use appropriate mathematical formulae or techniques in order to process the information and draw the relevant conclusion.
- (v) A student should be made aware of history of mathematics and hence of its past, present and future role as part of our culture.

3) S.Y. B. Sc. (Computer Science), Electronics

Course Outcomes : On completion of the course, student will be able

1. To write programs for 8051 microcontroller
2. To interface I/O peripherals to 8051 microcontroller
3. To design small microcontroller based projects
4. Define and explain terminologies of data communication.
5. Understand the impact and limitations of various digital modulation techniques
6. To acknowledge the need of spread spectrum schemes.
7. Identify functions of data link layer and network layer while accessing communication link
8. To choose appropriate and advanced techniques to build the computer network
9. To acquire skills of Embedded C programming
10. To know multiplexing and modulation techniques useful in developing wireless application
11. Do build and test own network and do settings.
12. To understand the difference between general computing and the Embedded systems.
13. To know the fundamentals of embedded systems.
14. Understand the use of Single board Computer (Such as Raspberry Pi) for an embedded system application.
15. Familiar with the programming environment to develop embedded systems and their interfaces with peripheral devices.
16. To develop familiarity with tools used to develop in an embedded environment.
17. Know working of wireless technologies such as Mobile communication, GSM, GPRS
18. Become familiar with 3G and 4G Cellular Network Technologies for Data Connections.
19. Understand working principles of short range communication application
20. Get introduce to upcoming technology of Internet of Things
21. Explore themselves and develop new IoT based applications.

T.Y.B.Sc.(CS)

Objectives:

- To develop problem solving abilities using a computer
- To build the necessary skill set and analytical abilities for developing computer based solutions for real life problems.
- To imbibe quality software development practices.

- To create awareness about process and product standards
- To train students in professional skills related to Software Industry.
- To prepare necessary knowledge base for research and development in Computer Science
- To help students build-up a successful career in Computer Science

➤ **TITLE OF PAPER : Systems Programming Code No. : CS-331**

Course Outcomes : On completion of the course, student will be able

- Understand the design structure of a simple editor.
- Understand the design structure of Assembler and macro processor for an hypothetical simulated computer.
- Understand the working of linkers and loaders and other development utilities.
- Understand Complexity of Operating system as a software.

➤ **CS -341: Operating Systems**

Course Outcomes

1. Master functions, structures and history of operating systems
2. Master understanding of design issues associated with operating systems
3. Master various process management concepts including scheduling, synchronization, deadlocks
4. Be familiar with multithreading
5. Master concepts of memory management including virtual memory
6. Master system resources sharing among the users
7. Master issues related to file system interface and implementation, disk management
8. Be familiar with protection and security mechanisms

➤ **TITLE OF PAPER : Theoretical Computer Science
Code No. : CS-332**

Course Outcomes

- To have an understanding of finite state and pushdown automata.
- To have a knowledge of regular languages and context free languages.
- To know the relation between regular language, context free language and corresponding recognizers.
To study the Turing machine and classes of problems.

➤ **TITLE OF PAPER : Compiler Construction Code No. : CS-342**

Course Outcomes

- To understand design issues of a lexical analyzer and use of Lex tool
- To understand design issues of a parser and use of Yacc tool
- To understand issues related to memory allocation
- To understand and design code generation schemes

➤ **TITLE OF PAPER : Computer Networks -I & II**
Code No. : CS-333 & CS-343

Course Outcomes

After completing this course the student must demonstrate the knowledge and ability to:

1. Independently understand basic computer network technology.
2. Understand and explain Data Communications System and its components.
3. Identify the different types of network topologies and protocols.
4. Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of each layer.
5. Identify the different types of network devices and their functions within a network
6. Describe the components of a data communications system.
7. Identify key considerations in selecting various transmission media in networks.
8. Explain the role of line codes in a data communications network.
9. Describe the various types of signals and their features.
10. Identify and define roles and features of various data transmission protocols.
11. Describe the various error detection and correction schemes.
12. Understand and building the skills of subnetting and routing mechanisms.
13. Familiarity with the basic protocols of computer networks, and how they can be used to assist in network security and implementation.

➤ **TITLE OF PAPER : Internet Programming I Code No. : CS-334**

Course Outcomes

After completing this course the student must demonstrate the knowledge and ability to:

- Use a PHP editing program.
- Develop functional PHP script.
- Develop a Mysql database.
- Understand the use of PHP with HTML.
- Understand the ability to post and publish a PHP website.
- Develop Database connectivity using Mysql.
- Debug script.
- Develop Web Applications
- Describe the architecture of client side and server -side web applications
- Identify the appropriate programming environment for developing dynamic client Side and server -side web applications.
- Plan, develop, debug, and implement interactive client -side and server-side web applications.
- Identify the tools needed to create dynamic client-side and server-side web applications.
- Evaluate and validate web applications for conformance to the latest W3C markup standards.
- Choose between server-side and client-side programming, depending on the task to be performed

➤ **TITLE OF PAPER : Internet Programming II Code No. : CS-344**

Course Outcomes

Upon successful completion of this course, students should be able to:

- Apply technological features of client-server interaction including the HTTP protocol, cookies, maintaining state, and limitations.
- Acquire knowledge on the types of software capabilities that can be programmed for the server side, thus making adequate design and architectural decisions.
- Acquire knowledge on applications of Web-based technology in the real world (including well-recognized examples).
- Perform Web application evaluations through user testing and acceptance of feedback and need for change.
- Assess the convenience of developing accessible, usable and secure Web applications

➤ **TITLE OF PAPER : Programming in Java-I & II
Code No. : CS-335 & CS-345**

Course Outcomes

- Student will gain knowledge about basic Java language syntax and semantics to write Java programs and use concepts such as variables, conditional and iterative execution methods etc.
- Student will understand the fundamentals of object-oriented programming in Java, including defining classes, objects, invoking methods etc and exception handling mechanisms.
- Student will understand the principles of inheritance, packages and interfaces.
- Student will be able to use the Java SDK environment to create, debug and run simple Java programs.
- Student will be able to implement object oriented concept like inheritance, polymorphism, encapsulation and data abstraction practically.
- Student will learn how to implement concurrent applications using threads; describe problems related to concurrent programming and how to solve these problems.
- Student will implement applications with simple graphical user interfaces.
- Student will create web applications by using servlet, JSP etc.
- Student will implement database handling by using jdbc tool.

➤ **TITLE OF PAPER : Object Oriented Software Engineering
Code No. : CS-336**

Course Outcomes

- 1.This subject aims to give students an understanding of the Object -oriented programming paradigm in the context of developing software that is well specified, designed and tested.
- 2.Students will be exposed to a variety of notations at different stages of the development process.

3. Object -oriented Software Engineering provides basic knowledge, skill and judgement needed to develop complex software by formulating relevant responses at each stage of the software development life-cycle, from analysis of a formally specified problem statement with respect to its accuracy and completeness, to effective testing of the software product
4. A student should be able to design efficient and complex object-oriented software to solve complex engineering problems.
5. It helps to develop teamwork and management skills to divide tasks and effectively develop projects in large software teams.
6. A student should be able to produce industry standard documentation from requirements, analysis, and design through testing and verification

➤ **TITLE OF PAPER :Computer Graphics**
Code No. : CS-346

Course Outcomes

- To list the basic concepts used in computer graphics.
- To implement various algorithms to scan, convert the basic geometrical primitives, transformations, Area filling, clipping.
- To describe the importance of viewing and projections.
- To define the fundamentals of animation, virtual reality and its related technologies.
- To understand a typical graphics pipeline To design an application with the principles of virtual reality
- To provide comprehensive introduction about computer graphics system, design algorithms and two dimensional transformations.
- To make the students familiar with techniques of clipping, three dimensional graphics and three dimensional transformations.
- The computer graphics course prepares students for activities involving in design, development and testing of modeling, rendering, shading and animation.

M.Sc. Computer Science

1) First Year Semester 1 - Choice Based Credit System Syllabus

➤ **Course Name: Paradigm of Programming Language**

Course Code: CSUT111

Course Outcomes: -

- To Prepare student to think about programming languages analytically:
- Separate syntax from semantics
- Compare programming language designs

- Understand their strengths and weaknesses
- Learn new languages more quickly
- Understand basic language implementation techniques
- Learn small programs in different programming Languages

➤ **Course Code: CSUT112 Course Name: Design and Analysis of Algorithm**

Course Outcomes: -

- To design the algorithms
- To select the appropriate algorithm by doing necessary analysis of algorithms
- To learn basic Algorithm Analysis techniques and understand the use of asymptotic notation
- Understand different design strategies
- Understand the use of data structures in improving algorithm performance
- Understand classical problem and solutions
- Learn a variety of useful algorithms • Understand classification of problems
- To provide foundation in algorithm design and analysis
- To develop ability to understand and design algorithms in context of space and time complexity.

➤ **Course Code: CSUT113 Course Name: Database Technologies**

Course Outcomes: -

- Provide an overview of the concept of NoSQL technology.
- Provide an insight to the different types of NoSQL databases
- Make the student capable of making a choice of what database technologies to use, based on their application needs.

➤ **Course Code: CSDT114A Course Name: Cloud Computing**

Course Outcomes: -

- To understand the principles and paradigm of Cloud Computing
- To appreciate the role of Virtualization Technologies
- Ability to design and deploy Cloud Infrastructure
- Understand cloud security issues and solutions

➤ **Course Code: CSDT114B Course Name: Artificial Intelligence**

Course Outcomes: -

- To learn various types of algorithms useful in Artificial Intelligence (AI).
- To convey the ideas in AI research and programming language related to emerging technology.
- To understand the numerous applications and huge possibilities in the field of AI that goes beyond the normal human imagination.

➤ **Course Code: CSDT 114C Course Name: Web Services**

Course Outcomes: -

- To understand the details of web services technologies like WSDL,UDDI, SOAP
- To learn how to implement and deploy web service client and server
- To explore interoperability between different frameworks
- To understand the concept of RESTful system.

2) First Year Semester 2

➤ **Course Code: CSUT121 Course Name: Advanced Operating System**

Course Outcomes: -

- The course objectives ensure the development of students applied skills in operating systems related areas. Students will
- Gain the ability to install and customize Linux operating systems.
- Gain knowledge in writing software routines, modules or patches for the operating systems, using respective system calls to implement, debug or tailor device drivers and interrupt handlers.
- Be confident in presenting short talks regarding the operating systems internals and various operating system issues..
- Have an understanding of high-level OS kernel structure
- Gained insight into hardware-software interactions for compute and I/O
- Have practical skills in system tracing and performance analysis
- Have been exposed to research ideas in system structure and behavior
- Have learned how to write systems-style performance evaluations
- Understanding the basic set of commands and utilities in Linux/UNIX systems
 - To learn to develop software for Linux/UNIX systems
 - To understand the inner workings of UNIX-like operating systems.
 - To obtain a foundation for an advanced course in operating systems.

➤ **Course Code: CSUT122 Course Name: Mobile Technologies**

Course Outcomes: -

- To impart basic understanding of the wireless communication systems.
- To expose students to various aspects of mobile and ad-hoc networks.
- Understand the issues relating to Wireless applications Understand the Mobile security

➤ **Course Code: CSUT123 Course Name: Software Project Management**

Course Outcomes: -

- Software Metrics and Project Management covers skills that are required to ensure successful medium and large scale software projects.
- It examines Requirements Elicitation, Project Management, Verification & Validation and Management of Large Software Engineering Projects.
- Students learn to select and apply project management techniques for process modelling, planning, estimation, process metrics and risk management; perform software verification and validation using inspections, design and execution of system test cases.

➤ **Course Code: CSDT124B Course Name: Human Computer Interaction**

Course Outcomes: -

- Design effective dialog for HCI.
- Design effective HCI for individuals and persons with disabilities.
- Assess the importance of user feedback.
- Explain the HCI implications for designing multimedia/ ecommerce/ e-learning Web sites.
- Develop meaningful user interface.

➤ **Course Code: CSDT124C Course Name: Soft Computing**

Course Outcomes: -

- To introduce the ideas of soft computational techniques based on human experience.
- To generate an ability to design, analyze and perform experiments on real life problems using various Neural Learning Algorithms.
- To conceptualize fuzzy logic and its implementation for various real world applications.
- To apply the process of approximate reasoning using Neuro Fuzzy Modeling.

- To provide the mathematical background to carry out optimization using genetic algorithms.

3) Second Year Semester 1

➤ CSUT231- Software Architecture and Design Patterns

Course Outcomes: -

- Recognize the characteristics of patterns that make it useful to solve real-world problems.
- Process available data using python libraries and predict outcomes using Machine Learning algorithms to solve given problem.
- Able to use specific frameworks as per applications need.
- Design java application using design pattern techniques.

➤ CSUT232 Machine Learning

Course Outcomes: -

- Recognize the characteristics of machine learning that make it useful to real-world problems.
- Process available data using python libraries and predict outcomes using Machine Learning algorithms to solve given problem.
- Able to estimate Machine Learning models efficiency using suitable metrics.
- Design application using machine learning techniques.

➤ CSUT233- Web Frameworks

Course Outcomes: -

- Students will be ready with the technology which is used widely in Industry as a part of full stack developer.
- Students will know the powerful way to develop the web application in Python.
- Students will understand what really the asynchronous programming.
- Build and deploy robust Django Web App.
- Integrate with Restful web services.

➤ CSUT234A Big Data Analytics

Course Outcomes: -

- Recognize the characteristics, applications of big data that make it useful to real-world problems.

- Process available data using big data tools hadoop file system and predict outcomes to solve given problem.
- Study & Design various case studies using big data tools/commands and analyse it.

4) Second Year Semester 2

➤ CSUIT241 : Industrial Training /Institutional project

Course Outcomes: -

- Student will work on actual project in the company.
- He/She will understand actual work environment, real time problems and problem solving techniques.